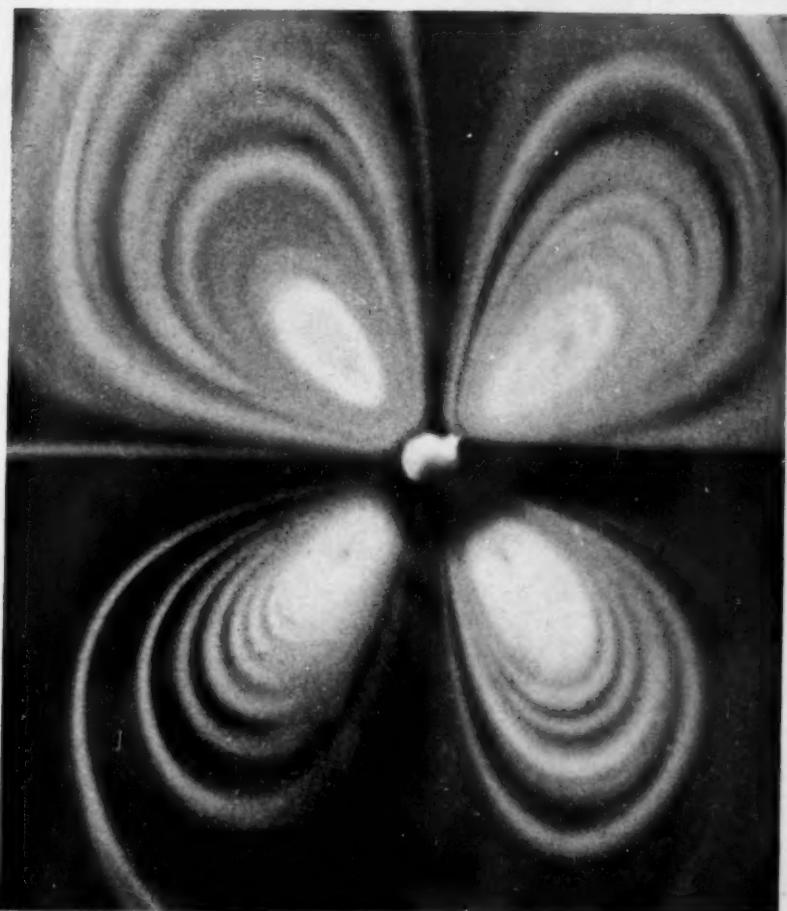


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# SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE•



**Smoke Whirlwinds in Organ Pipe**

See Page 44



JULY 18, 1931

A

SCIENCE SERVICE PUBLICATION

## SCIENCE NEWS LETTER

VOL. XX

No. 536

The Weekly  
Summary of  
Current  
Science

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## DO YOU KNOW THAT

Water in the open Atlantic Ocean contains roughly 3.5 per cent of salt, but in the Siberian Ocean the percentage runs as low as 1.3 and in the Suez Canal as high as 5.1.

In 1911 there were fewer than 620,000 automobiles in the United States; now there are almost 26,700,000.

A luminous mushroom found in Australia gives off such a clear green light that it is possible to read by it.

Alaska recently increased the bounty on wolves and coyotes from \$5 on coyotes and \$10 on wolves, to \$15 on either.

A lighthouse keeper of Washington State says that clear weather fog sometimes overtakes a fast steamer and moves on ahead of it.

Not one plant was in bloom in Mount McKinley National Park, Alaska, on June 1, according to the park superintendent.

Unbreakable eye-glass lenses have been tested.

Ditches have replaced fences in the elephant yard of the Berlin Zoological Gardens.

Cobwebs for moving picture scenes are made of liquid rubber, ether, and glue.

One hundred and seventy-two buffalo calves have been born in Yellowstone National Park this year.

At Western Reserve University, two hens sitting in relays hatched three eagle's eggs.

A new farm machine does several jobs at once, combining the work of the spring tooth harrow, the roller, and the grain drill.

One commercial rabbitry in Michigan, disposing of at least 8,000 rabbits every week, sells all of the front feet to concerns manufacturing good luck charms.

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Science Service presents over the radio, an address

## WHY CERTAIN SCHOOL CHILDREN ARE BACKWARD

By Dr. C. W. Stiles, medical director of the National Institute of Health, Washington.

Friday, July 24, at 2:45 P. M., Eastern Standard Time

Over Stations of

The Columbia Broadcasting System

ENGINEERING

# Tides Yield Continuous Power In English Experimental Plant

## Unique Storage Method in Which Water is Heated By Friction Supplies Energy at Flood Tide

**A**N EXPERIMENTAL power plant which generates electricity continuously from the ebb and flow of the tides has been constructed and successfully operated at the Avonmouth Docks, in the Bristol Channel.

The plant is the invention of Paul Shishkoff, formerly a Russian subject. It includes a novel method of storing the excess power produced at low tide so that a continuous supply of energy can be obtained at all times. The capacity of the installation is three hundred horsepower.

Water for operating an ordinary turbine is caught within a dock at high tide. Then, as the tide recedes, the water is allowed to run out of the dock through a vertical pipe at the foot of which is the turbine, or water wheel. This wheel is connected by a vertical shaft to an alternating current generator.

A working difference of level between the inside and outside of the dock of from seven feet at high tide to thirty-two feet at low tide is thus made available. The plant is so designed that when this working head of water is at its greatest more power is produced than the generator can take care of.

### Excess Power Stored

At these times a water brake on the shaft with the driving wheel is used to store the excess power. This brake really churns water and thus heats it. The water, heated to 390 degrees Fahrenheit, enters a large vessel called an "accumulator," where it is kept under 200 pounds per square inch pressure until the direct power supply from the water wheel falls off.

The superheated water from the accumulator is now released under reduced pressure to form steam. Heat necessary to produce vaporization is derived from the remaining water, which is slightly reduced in temperature.

This steam drives a turbine connected to a generator. Thus power is available even when the low tide level can not be used directly. The exhaust steam from the turbine is condensed and re-

turned to the brake where it is again heated at times of maximum power.

The pumping of water to a higher level by means of excess power is the only other practicable means of storing power. Apart from the use of this new scheme in connection with the tides, it is of great interest in that it provides possible answer to the important engineering problem of storage.

Mr. Shishkoff has proposed that a larger model of his system be constructed in the Severn river. An artificial basin of  $12\frac{1}{2}$  square miles is planned to make available enough water for generating 160,000 kilowatts at peak load.

This development, it is claimed, would not interfere with the tidal flow or with navigation in the Severn.

It is claimed that electricity at forty-four hundredths of a cent per kilowatt could be made by such an installation, which compares favorably with a coal-burning plant of the same capacity.

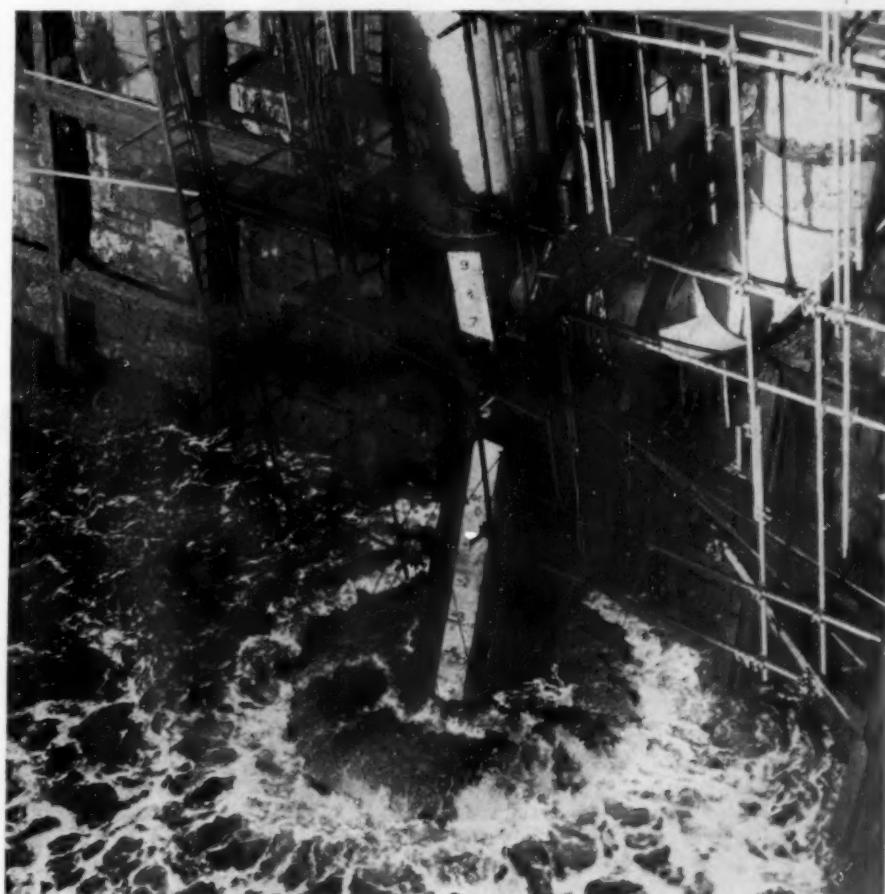
A rival scheme designed by a Swiss engineer, Huguenin, would require the building of a large dam and would use two-way flow turbines. It is still in the theoretical stage.

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ARCHAEOLOGY

## Killing Kinsmen Possibly Practised in Mid-Europe

**K**ILLING all of the chief's kinsmen and servants so that they might go with him into the afterworld as retinue, a custom hitherto known only in southern Russia and the Near East, may have been practised far up the Danube valley in Europe, if finds in a recently excavated Bronze Age mound near Jois in Austria have been interpreted correctly.



IT HEATS WATER BY BEATING IT

*That is the novel way the experimental tidal power plant has of storing power at low tide when it is plentiful, for use at high tide, when it is hard to produce.*

The principal skeleton in this tumulus was that of a man, stretched out full length, with skull intact. Above it was the skeleton of a woman, and nearby that of a child with a bronze bracelet on its arm. Clustered round were the bones of about a dozen other persons, all adults, and all with their skulls caved in as though by blows of clubs or heavy stones.

Dr. Alexander Seracsin, Vienna archaeologist, who reports the find in the German scientific journal *Forschungen und Fortschritte*, thinks that these battered skeletons may be those of the

chief's wife and son, and of members of his household, who chose (or were chosen) to follow their dead master into the underworld.

Dr. Seracsin reports the excavation of two other burial mounds of later date in the same neighborhood. These belonged to two different periods in the Iron Age. Nearby there is also a very old churchyard of medieval and modern times; so that in this small area there is a continuous record of life, death and burial from Bronze Age times down to the present.

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ARCHAEOLOGY

## Scientist Studies Abandoned Mexican Cities on Cliff

**T**WO ANCIENT Indian cities never before visited by archaeologists have just been explored by Eduardo Noguera of the Mexican Department of Pre-Spanish Monuments.

These two sites, Toluquilla and Ranas, some twenty miles apart in the Sierra Gorda mountains of Queretaro, are veritable fortress cities built on precipitous cliffs whose only approaches are defended by double and triple walls of enormous thickness. The abandoned cities, now covered with a dense vegetation, once dominated extensive regions. They are near no modern cities or towns, but because the explorations have revealed that they are probably among the most important ruins in the country, the Mexican government is preparing to clear the site.

The exploration and excavations made by Señor Noguera indicate that these are probably Toltec cities, built by a race which antedated the Aztecs who dominated middle Mexico before the Spanish Conquest. The Toltecs flourished centuries before Columbus discovered America, and were the conquerors of the famous Mayas of Yucatán a thousand miles away.

Toluquilla has two great "ball-courts," rectangular areas enclosed by massive walls of stone, typical of the Toltecs, and found wherever these people once imposed their culture, a most famous example being the Maya city of Chichen Itza which has its Toltec ball-court. Toluquilla's sister-city of Ranas has two such ancient playgrounds.

Although cornices, facades, and

other architectural details of the buildings of these two cities are distinctly Toltec, there is also evidence of the Totonacs, a people who lived on the coastal plain of Vera Cruz and the Panuco River basin. Such is the discovery in Toluquilla and Ranas of stone "yokes" beautifully sculptured, and typical only of the Totonac culture.

The use of these yokes, known in the Vera Cruz region, has always been a mystery to archaeologists. They resemble yokes of oxen, and some archaeologists think that these great horse-shoe shaped stones might have been hung over the victim's neck to weight the head in human sacrifice. The

MEDICINE

## Ordinary Decay of Teeth Is Controlled by Proper Diet

**D**ENTAL CAVIES, a disease in which the teeth decay and cavities form, can be controlled by suitable diet, it appears from the report to the American Dental Association of Dr. R. W. Bunting, Dr. Philip Jay and Dr. Dorothy Hard of the University of Michigan School of Dentistry.

These investigators carried on an experiment in caries control for one year with three large groups of children in public schools and orphans. The children were given a varied diet, fortified by one quart of milk and some



ANCIENT PERFUMER

The head-shaped object pictured above is an incense burner typical of those used by the Toltecs, the race of Indians which flourished centuries before Columbus discovered America. Found in the region of the newly-explored cities, Toluquilla and Ranas, the incense burner is expected to be of value in tracing relationships between these Toltec municipalities.

presence of these typical Totonac objects in an otherwise largely Toltec city suggest that this was the meeting-ground of the two cultures. Early chronicles say that the Toltecs came from the Panuco region, and settled in middle Mexico a while before they ventured south to conquer the Mayas, perhaps some early relatives.

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green vegetables and fruit for each child every day. They were given neither cod liver oil nor viosterol. They had no sugar on cereals or in beverages, very little sweetened preserves and pastries, and little or no candy.

"The elimination of sugar was made on the assumption that the average child consumes more carbohydrate in this form than is required and that such overconsumption of sugar perverts the appetite for other necessary food factors, thus unbalancing the diet," the investigators reported.

In addition to the diet, a mouth wash of hexylresorcinol diluted with three parts of water was used daily.

At the beginning of the experiment, the teeth were carefully examined and their condition recorded, with actual drawings of the approximate size and location of all cavities and fillings. At the end of the year, the children were examined again in the same manner, and the results of the two examinations compared.

In three groups in which fairly adequate diets were provided, active caries was almost negligible and old cavities were quite uniformly arrested. In two groups in which the diets were not carefully planned, the dental disease was very rapid and active in its course. Further similar studies are planned.

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FORESTRY

## New Woods Sought For Lead-Pencils

THE PENCIL wood supply near large factories is practically exhausted and the industry is now investigating the possibility of utilizing Alaska red cedar, the finest-grained wood of the Northwest. Cedar wood intended for lead pencils must be soft, light yet strong, close and straight-grained and free from defects. The older the tree the better pencil wood it makes. The wood from the heart of aged logs that have lain in deep woods for years makes admirable pencil material.

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PHYSICS

## Novel Centrifuge Whirls With Speed Triple That of Bullet

### University of Virginia Physicists Invent Device That Has Developed Force Equal to a Million Gravities

A NEW TYPE of centrifuge, whirling so rapidly that its rim travels three times as fast as the bullet leaving the muzzle of an Army rifle, has been devised at the University of Virginia by Dr. J. W. Beams and A. J. Weed. They describe their invention in *Science*.

The principle of the new centrifuge is very simple. The moving part consists of a metal box shaped like a top, with flutings placed at an angle on its underside. This rests in a conical cup, into which a stream of air is forced under pressure from beneath. The air lifts the top, thus serving as a virtually frictionless bearing, and at the same time pushes against the flutings as against the blades of a turbine, spinning it around at terrific speed.

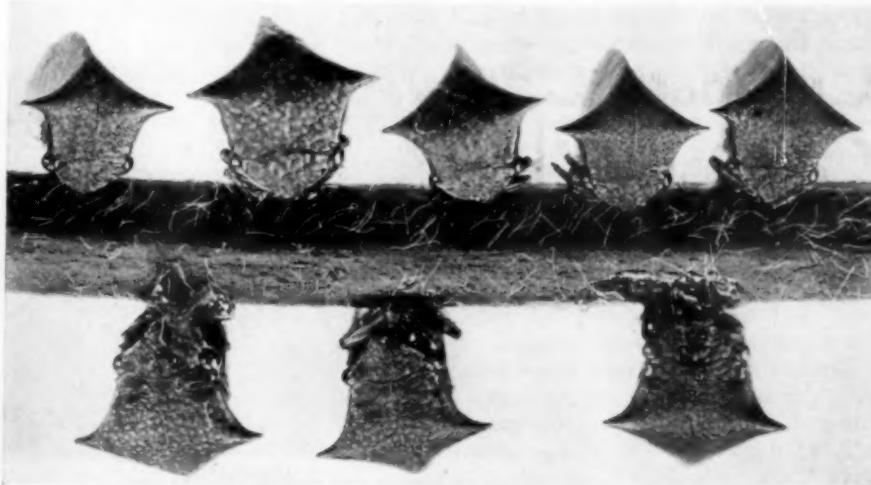
The two physicists state that they have obtained rotational speeds as high as half a million a minute with their apparatus. With one specially constructed model they obtained speeds of such an order that the rim was moving at the rate of about 10,000 feet a second. This is approximately three times as fast as a bullet moves at the instant it leaves the

muzzle of a military rifle. Dr. Beams and Mr. Weed state that they have obtained centrifugal force equal to a million times the force of gravity.

Centrifuges are used in laboratories and factories and on farms for speeding up the separation of things so intimately mixed that they would take a long time about coming apart if left to themselves. The cream separator and the Babcock milk tester are two types of centrifuge in very common use. Devices that whirl the water out of clothes, used in laundries and in some types of home electric washers, are also centrifuges. In scientific laboratories much higher centrifuge speeds, with correspondingly higher forces, are needed for such operations as clearing fine silt out of turbid water, separating cells into their constituent parts, and getting tiny water droplets out of oil.

By means of ingenious arrangements of outlet tubes, the two Virginia scientists are able to operate their centrifuge continuously, feeding new supplies of the material to be separated in through a center opening and obtaining the parts separated out in one or more collectors mounted on top of the apparatus.

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#### IN THEIR WORLD THERE IS NO UPSIDE DOWN

*Solemn as so many capped French judges, this sociable group of buffalo tree-hoppers might be mirror people contemplating their own images, but for the fact that their numbers and positions fail to match. Motionless, for many minutes, they belie their agility. Disturb one, and he leaps away so suddenly that it seems like a magic disappearance.*

ORNITHOLOGY

### Italy's First Bird Station Established by Prince

PRINCE CHIGI of Rome, one of the most prominent of Italian ornithologists, has provided ground and buildings upon his property, Castel Fusano, near Ostia on the west coast of Italy, for a bird station. Here bird migration will be scientifically observed. Prof. Raffaele of the University of Rome has been placed in charge.

Nets are used to capture the birds arriving from Africa between March and July. The captured birds are tabulated, banded and set free. In the fall the migrations of the thrushes will be studied.

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## PHYSICS

# Exploring the Extremes of Temperatures

## Conquerors of the Lower Temperature Scale, Scientists Consider Creating on Earth the Heat of Giant Stars

By D. LINDSAY WATSON

INTENSE COLD, lower in temperature than the extreme chill of empty interstellar space, is within the reach of man. Extreme cold has become a tool for physicists in their study of the nature of matter.

But the most extreme temperature in the universe, believed to exist in the center of the hotter stars to the astounding heat of some 72,000,000 degrees Fahrenheit, has not yet been approached on earth. An exploding electric wire with a temperature of 45,000 degrees represents the maximum temperature scientists have reached. This is, however, many times the heat produced by the hottest of practically useful temperatures, that used in welding with atomic hydrogen flames, which reaches some 7,640 degrees Fahrenheit.

At the cold end of the temperature scale is absolute zero, a point that probably is not attainable either by man on earth or under natural conditions outside the earth. There, all motion of the very elements of matter, the atoms, ceases. Electricity would find no resistance in a conductor at absolute zero, but would flow on forever. Absolute zero on the Fahrenheit scale is 459 degrees below zero.

### Tripoli Hottest

Man has pushed his temperature explorations down to within 1.6 degrees Fahrenheit of absolute zero. This intense cold, lower than that of the space between the stars which Prof. A. S. Eddington estimates to be 5.4 degrees Fahrenheit above absolute zero, was reached at Leiden, Holland, a few years ago. In the production of liquid helium at a temperature of 3.4 degrees Fahrenheit above absolute zero at the National Bureau of Standards this year, the record low temperature for the United States was reached. Helium becomes liquid somewhat higher at 7.4 degrees above absolute zero.

Contrast these extreme temperatures of science's making with the highest and lowest temperatures made by weather.

The hottest climatic temperature ever reported is 136 degrees Fahrenheit in the shade, in Azizia, Tripoli. Two degrees less has been felt by Americans in Death Valley, California. Water boils at 212 degrees Fahrenheit or 671 on the absolute thermometer.

The coldest temperature made naturally on earth is believed to be somewhere in northern Siberia, where temperatures of 90 degrees below zero Fahrenheit have been observed. Actually this is still 369 degrees above the absolute zero of cold.

Man's highest artificial temperature, 45,000 degrees, is obtained for a brief instant by passing a 50,000 volt current through a fine wire of tungsten. There is a blinding flash, a bang, a puff of air and a light 100 times as bright as an equal area of the sun. The chromosphere or outer layer of the sun is actually at about 11,000 degrees Fahrenheit. The temperature of the explosion is measured by comparing its brightness with that of the sun.

The exploding wire cannot be used for any practical purpose. Atomic hydrogen flames, however, at 7,600 degrees, devised a short time ago by Dr. Irving Langmuir of the General Electric Company, are now being used for welding ships and pipes. The hydrogen is first broken up into its atoms in an electric arc and these are burned in oxygen to give a greater heat than ordinary molecular hydrogen. The usual oxyhydrogen blowpipe flame gives only 3,600 degrees Fahrenheit.

The blinding bluish-white flame of the oxyacetylene torch seen in many manufacturing plants is at 5,500 degrees. This is somewhat less than the estimated heat of the center of the earth, 6,000 degrees, approximately the temperature at which tungsten melts.

The best electric furnace gives only 4,900 degrees, though this is more than enough for many purposes. Iron melts at 2,745 degrees and is dull red at about 1,500.

Another attempt to achieve an extremely hot temperature was made recently at the Westinghouse Research Laboratories in East Pittsburgh. Here

a large current was carried by an arc in a vacuum, not by a wire, and concentrated on a small spot on a metal plate. Early hopes that star temperatures had been produced by this method were dashed, but some 5,400 degrees Fahrenheit was reached.

These are poor efforts, however, compared with temperatures found at great distances from the earth. By juggling some mathematical formulae Prof. Eddington has calculated the giant stars to have 72,000,000 degrees at their cores.

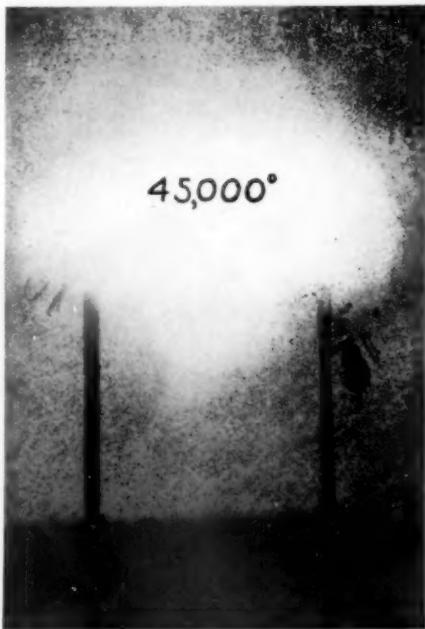
On the other hand, the universe can hardly improve man's best cold, for the absolute zero which we have approached within a degree or two cannot be surpassed by any agency in this world or the next.

### Liquid Air Made Industrially

Here are some other low temperatures:

Liquid hydrogen is at 36 degrees above absolute zero or — 423 degrees on the Fahrenheit scale.

Liquid air made industrially in large quantities and used at the rate of 100 quarts a day at the Bureau of Standards, has a much higher temperature. Its liquefying point or the boiling point of



A PUNY EFFORT

An exploding wire at 45,000 degrees Fahrenheit, man's greatest temperature, but a trivial accomplishment compared with the 72,000,000 degree estimated temperature of giant stars at their cores.

liquid air on the Fahrenheit scale is — 296 degrees. Liquid air is now made on a large scale industrially for the preparation of oxygen.

Solidified carbon dioxide gas, which is now gaining wide use as a refrigerant, is the coldest substance in everyday use. Its melting point is — 112 degrees, still higher and very near that Siberian temperature of — 90 degrees Fahrenheit.

If the pressure on liquid helium is reduced so that the helium evaporates rapidly, it is cooled still further. By compressing this super-cooled liquid, helium was solidified in 1927 at the University of Leiden, Holland, by Prof. W. K. Keesom, colleague of the great Kammerlingh Onnes. Prof. H. Kammerlingh Onnes, the dean of low temperature researchers, was himself the first to make liquid helium.

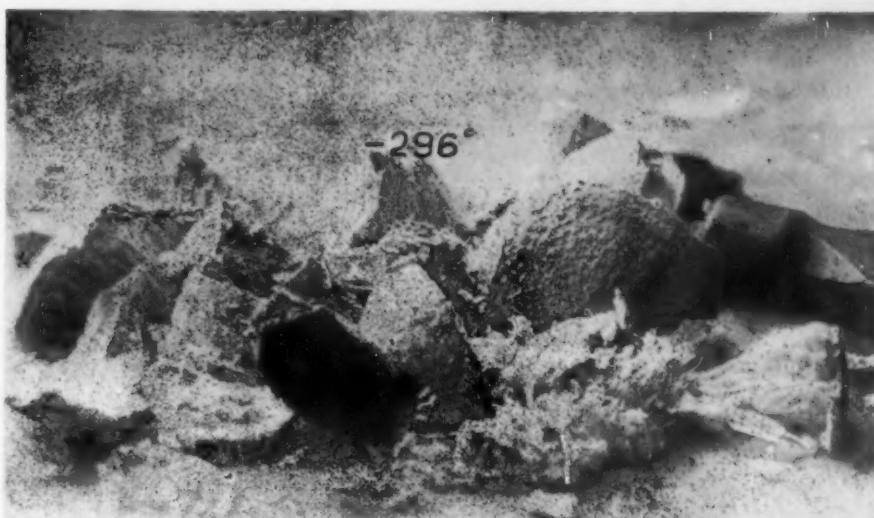
Extreme cold represents rest, rigidity and fixedness for the ultimate atoms of matter. Heat is excitement, a rushing around of the atoms in great agitation. As we pass to lower temperatures, electrons gradually set into their places on the atom and the commotion subsides, though everything is still gaseous. If we make the atoms even colder, they will form a liquid when they are near enough and quite enough to shake hands with their neighbors continuously. They still slide over each other, but they will not be able to escape and dash around.

### The Cold of Death

As the cold increases, they suddenly lock fast to each other to form a solid. The atoms may now quiver more or less, but as the last dregs of heat are taken away, the stillness of death overtakes them. This is the absolute zero, where no motion of the atoms whatever is found. It is now easy to see why you cannot go beyond absolute zero. Once you are dead, you cannot be deader.

At the Bureau of Standards Dr. H. C. Dickinson, Dr. F. G. Brickwedde, W. Cook, R. B. Scott and J. M. Smoot perfected their super-refrigerator just ahead of two other laboratories competing for the honor of being the first to make liquid helium in this country, the Johns Hopkins University and the University of California.

In addition to the Washington apparatus and those of the other two United States laboratories, four or five institutions throughout the world are equipped to outdistance efforts of the severest polar winter. These are the University of Leiden, Holland, the Imperial Institute in Berlin (Dr. W. Meissner), the University of Berlin (Dr. Franz Simon), the University of Toronto, Can-



AMONG THE FREAKS OF LOW TEMPERATURES

*An orange immersed in liquid air, at —296 degrees Fahrenheit, becomes so hard and brittle that it can be broken up with a hammer. Liquid mercury is frozen solid and a flexible rubber hose becomes as stiff as a steel pipe.*

ada (Prof. J. C. MacLennan), and the University of Cambridge, England. Liquid helium has been made at all these places except Cambridge.

Why this pursuit of extreme cold? What useful knowledge do scientists hope to find at the low end of the temperature scale?

The magnificent achievements of physicists on the constitution of matter point clearly to low temperature research for the solution of some of its problems. At these intense colds, where the disturbing darting to-and-fro of the atoms is reduced to a minimum, the nature and properties of substances show up more clearly. The amount of heat that matter will hold at these low temperatures will be investigated. At the Bureau of Standards, Dr. Dickinson's group hopes to go on to establish an accurate scale of temperature near the absolute zero, something that is lacking at present.

At the low temperature achieved, every substance except helium itself is frozen hard, even gases like hydrogen, which next to helium is the most difficult gas to liquefy.

Super-electro magnets may soon be made in the cold of liquid helium, because a hundred thousand times more current is carried by metals at the lowest temperatures than under ordinary conditions.

Dr. Peter Kapitza of the University of Cambridge, England, is already busy with this problem. Using giant surges of current up to 70,000 amperes he has already made stronger magnets than were ever created before. By immers-

ing his wires in liquid helium he will be able to use still larger currents and make more powerful magnets.

At the University of Berlin, low temperature technique has reached its highest development. Under the direction of Dr. Franz Simon 13 to 15 quarts of liquid hydrogen per hour are made there.

Again and again a curiosity in the laboratory has become an everyday commodity. Such may easily happen in this case. Commercial liquid hydrogen is certainly an immediate possibility and, at no very distant future, perhaps, commercial liquid helium.

### Surpass Absolute Zero?

Are still lower temperatures possible? Can the absolute zero itself be reached or even surpassed? These are favorite questions. At present no other means of lowering further the temperature than that used by Prof. Keesom to make solid helium, is known. So close to absolute zero, every hundredth of a degree is gained at the greatest pains, but no doubt the experimental limit will be lowered.

Matter itself might be destroyed if the absolute zero were reached. Super-X-rays devastating everything in their path, similar to but immensely stronger than the cosmic radiation that streams down into the earth's atmosphere from the depths of space, would result from this achievement.

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## ASTRONOMY

**Discoverer of Pluto Gets First Slosson Award**

**C**LYDE TOMBAUGH, the young Kansas astronomer who discovered the planet Pluto last year at the Lowell Observatory, will become a student at Kansas University as the first recipient of a scholarship founded in memory of another Kansas scientist who made his mark, the late Dr. Edwin E. Slosson, first director of Science Service.

The Edwin Emery Slosson scholarship was recently founded at Dr. Slosson's alma mater by his widow, Mrs. May Preston Slosson, and his son, Prof. Preston Slosson of the University of Michigan. Mr. Tombaugh, designated as its first beneficiary, has never attended college. He finished a high school course, followed astronomy as a hobby, and finally was offered a position at the Lowell Observatory where his skill with the photographic telescope resulted in the finding of the long-sought trans-Neptunian planet and gained him a place in the astronomical hall of fame.

Because of a certain program of work which he had undertaken at the observatory, Mr. Tombaugh has been granted a year's leave of absence by Kansas University before he takes up his studies there. He will receive the Slosson scholarship during his entire four-year course.

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## ORDNANCE

**Army Officers to Test New High Velocity Rifle**

**O**RDNANCE officers of the U. S. Army are investigating the claims of H. Gerlich, German arms inventor, to sensational new velocities obtained with his newest cartridge, enabling a rifle-armed infantryman to put a tank out of action. Steps have been taken to obtain one of his rifles, which will be subjected to tests.

Herr Gerlich is well known as the developer of a line of successful high-velocity sporting rifles, which depend on small-calibered bullets moving at tearing speeds for their effect, rather than on slower, heavy, smashing missiles. Tests have been made in the past with a .28-caliber bullet at velocities of around 4,000 feet a second; the present claim is to an increase in velocity up to more than 5000 feet a second.

Ordnance officers expressed considerable curiosity and some doubts regarding

the price at which such velocities can be obtained with present type rifles and without a radical change in type of propelling powder. Velocities of 5000 feet a second and more can be obtained, even with much larger projectiles than the ordinary small-arms bullet. The long-range gun that shelled Paris during the war had a muzzle velocity of more than 5000 feet a second on its eight-inch shells. But this velocity was purchased at a price: after about three dozen shots the lining of the gun, particularly near the powder chamber, was so eroded by the intense heat and pressure of the firing that the piece had to be relined.

*Science News Letter, July 18, 1931*

## CHEMISTRY-BOTANY

**Single Oxygen Atom Turns Rose Geraniums Salmon**

**T**HAT SOME GERANIUM flowers are rose pink and others salmon color is merely a matter of a slight change in a chemical formula. The chemical substances which cause these colors are nearly but not quite identical, it has been shown by R. Scott Moncrieff at the Sir William Dunn School of Biochemistry of Cambridge University.

Mr. Moncrieff has shown that the difference between the molecules causing the color in these two flowers is due to a single atom of oxygen. In a formula containing 22 carbons, 30 hydrogens and 13 oxygens the addition of one oxygen atom brings about the change in hue.

The two pigments also occur in certain varieties of dahlias and the purple aster.

*Science News Letter, July 18, 1931*

## PSEUDO-MEDICINE

**Blunt Needles Thrust Into Sick Koreans to End Pain**

**S**TICKING blunt copper needles called "chims" into the body of a patient is one of the queer customs of old-time doctors of Korea, reported to the *American Journal of Surgery* by Dr. A. G. Anderson, of Pyengyang, Korea.

The needles are quite blunt at both ends, vary in length from three-quarters of an inch to about four inches, and are about the thickness of the lead refills for lead pencils. They are used to treat pain or swelling or both, particularly of the joints. They are driven into the abdominal cavity by main force, two or three at a sitting.

*Science News Letter, July 18, 1931*

**IN SCIENCE**

## ARCHAEOLOGY

**Bronze Age Ruins Found Near Dead Sea**

**R**UINS of an extensive Bronze Age town have been found in the lower Jordan valley, about four miles north of the Dead Sea, by an expedition of the Pontifical Biblical Institute. From metal and stone tools and pottery fragments it has been possible to work out a date of between 2500 and 1900 B. C. for the settlement.

The history of a major disaster was found written in a deep layer of ashes, in which a lower stratum of the ruins was buried. This had been leveled off with sand, and a second town built on the remains of the first. That the original inhabitants, or at least people of the same race, were the rebuilders is evidenced by the identity of the implements and pottery in both settlements.

*Science News Letter, July 18, 1931*

## CLIMATOLOGY-ARCHAEOLOGY

**Changing Climate May Have Pushed Corn Belt to West**

**D**O THE GREAT Indian mounds of the Hopewell culture, known best in Ohio, indicate that a drier climate prevailed there a few hundred years ago?

Prof. Paul B. Sears, of the University of Oklahoma, raises this question in *Science*, calling attention to the fact that the mound builder civilization depended primarily on the cultivation of corn, and that the Ohio center of the Hopewell culture, the highest development of the moundbuilder life, lay well to the east of the present corn belt center, which is near the Iowa-Illinois boundary.

This raises the further interesting question, which Prof. Sears does not undertake to answer, of whether the Ohio moundbuilders were driven westward by a climate that favored the development of forests and the warlike tribes of hunters that dwelt in them, or whether they lingered until the coming of the whites and the firearm traffic made their enemies strong enough to prevail against them.

*Science News Letter, July 18, 1931*

## SCIENCE FIELDS

## VITAL STATISTICS

**Girl Babies More Likely to Be Born Alive Than Boys**

**A** FEW MORE boys than girls are born every year in the United States, but baby boys have less chance of being born alive than baby girls, it appears from statistical studies.

Dr. William Walter Greulich, of the University of Colorado, has just reported to *Science* that of the babies born dead each year in a certain area, there are about 135 males to every 100 females. Of babies born alive, there are about 105 or 106 males to every 100 females.

During the first four or five months of pregnancy, the mortality among male embryos is very high compared with that of female embryos. The sex ratio for the first four months is 357.48 males to 100 females. This drops gradually to the seventh month and then increases, the increase probably being due to the fact that male babies are slightly larger than girls and consequently more subject to fatal injury at birth.

Figures for sex ratios of stillbirths are not very reliable for the early months, but indicate an enormous wastage of male embryos.

*Science News Letter, July 18, 1931*

## BACTERIOLOGY

**Hot Soapsuds Kill Disease Germs Easily, Doctor Says**

**C**OMMON ordinary soapsuds, particularly hot ones, are extremely good agents for killing germs, Dr. John E. Walker of Opelika, Ala., has just reported to the American Medical Association at Chicago. The germs of pneumonia, meningitis, diphtheria, syphilis, gonorrhea, influenza, and the streptococcus germ were all killed in about two minutes by comparatively weak solutions of soap in cool water, Dr. Walker found from his own and other investigations.

The soapsuds compared favorably with many newly-synthesized chemicals in germ-killing power. The brand of soap apparently made no difference, brown laundry soap, floating white soap, perfumed toilet soap, coconut oil and

olive oil soaps and soap made according to the standards of the U. S. Pharmacopoeia were equally effective.

"When properly used for cleaning the hands or for washing eating utensils, soaps are undoubtedly potent factors in preventing the spread of diseases due to these organisms," Dr. Walker concluded.

He added, however, that the germ of typhoid fever and the staphylococcus organism are not destroyed by soaps.

*Science News Letter, July 18, 1931*

## PHYSICS

**Vitamins A and B Print Initials on Photo Plates**

**T**WO of the vitamins, A and B, apparently give off some kind of a radiation that will affect the emulsion on a photographic plate in the same way that light and X-rays do. This is indicated by experiments performed by two women scientists, Sophie Botcharsky of London and Anna Foerlinger of Paris.

In the British scientific journal, *Nature*, they report as follows:

"Photographic plates were covered with aluminum foil and letters were cut out of the foil covering the glass side. Extracts of vitamins A and B were used to paint the letters VA and VB on the glass side. The vitamin A used was ether extract of dried ox-liver, the solvent being removed in nitrogen. Vitamin B was water extract of purified brewers' yeast. The plates, wrapped in black paper, were left for three days; on development, clear images of the letters were obtained.

"To confirm the results, vitamins A and B were sealed in two separate glass tubes, and the experiment was repeated. Very sharp images were again obtained.

"An extract of vitamin A prepared in a Paris research laboratory was investigated in the same way. It also gave positive results.

"Two solutions, one ten times stronger than the other, of vitamin A in paraffin oil and vitamin B in water, were compared. The plates showed clearly difference in strength. Control experiments of pure solvents gave unfogged plates.

"It is interesting to note that the effect of vitamin B is similar to that of vitamin A, although the two vitamins are of different origin.

"The experiments were repeated several times, and the same definite effect was present. We are proceeding with our research into these effects."

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## PHYSICS

**Train Wrecks Averted by New Patrolman of Roads**

**T**ELLING what the inside of a sound-looking locomotive rail is like without waiting for a train wreck to disclose a defect, is an achievement of science that is daily saving lives. In a report to the American Institute of Electrical Engineers, H. C. Drake, engineer of Sperry Products of New York, explains how this is accomplished with the detector car, the new safety patrolman of the railroad.

The detector car, which is a small, railway car, moves along the track at six miles per hour when examining rails. It labels the faulty rails whose smooth exterior deceives trackwalkers of the danger lurking in them. Operating on the principle that an electric current flowing through a rail must pass around any break in the metal, the detector car records this electrical deviation and marks the bad spot with a streak of paint.

Early in 1927, it was demonstrated in the laboratory that electricity could be used successfully to diagnose the ills, if any, of steel rails. After months of experimentation the first detector car was constructed for the American Railway Engineering Association.

Since its acceptance in 1928 by this group, detector cars have been placed in use on several railroads, and the number of bad rails located is mute evidence of the disasters averted.

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## ORNITHOLOGY

**Hailstorm Kills Storks on Errand of Good to Mankind**

**W**HILE ON AN ERRAND of good to man, countless thousands of storks, fabled bird of babyhood, were killed or wounded recently on an African plateau by a hailstorm of violence.

Their errand of good was not the duty of increasing population. The birds were feeding on man's pests, locusts and grasshoppers. So efficient are they as insect consumers that English settlers in South Africa call them the "great locust birds" and protect them by law, says the *African World*.

But man's law cannot save the big white birds from storms, and disasters such as the one which has just been reported are not uncommon occurrences.

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## GEOGRAPHY

# Surveying Yosemite Valley

## "A Classic of Science"

### From a Rare and Delightful Book of Exploration in the Old West by the First Head of the U. S. Geological Survey

*MOUNTAINEERING IN THE SIERRA NEVADA.* By Clarence King. Boston: James R. Osgood and Company, 1872.

BY AN ACT of Congress the Yosemite Valley had been segregated from the public domain, and given—"donated", as they call it—to the State of California, to be held inalienable for all time as a public pleasure-ground. The Commission into whose hands this trust devolved, had sent Mr. Gardner and myself to make a survey defining the boundaries of the new grant. It was necessary to execute this work before the Legislature should meet in December, and we undertook the work, knowing very well that we must use the utmost haste in order to escape a three months' imprisonment,—for in early winter the immense Sierra snowfalls would close the doors of mountain trails, and we should be unable to reach the lowlands until the following spring.

The party consisted of my companion, Mr. Gardner; Mr. Frederick A. Clark, who had been detailed from the service of the Mariposa Company to assist us; Longhurst, an *habitué* of the valley,—a weather-beaten round-the-worlder, whose function in the party was to tell yarns, sing songs, and feed the inner man; Cotter and Wilmer, chainmen; and two mules,—one who was blind and the other who, I aver, would have discharged his duty very much better without eyes.

We had chosen, as the headquarters of the survey, two little cabins under the pine trees near Black's Hotel. They were central; they offered us a shelter; and from their doors, which opened almost upon the Merced itself, we obtained a most delightful sunrise view of the Yosemite.

Next morning, in spite of early outcries from Longhurst, and a warning solo of his performed with spoon and fry-pan, we lay in our comfortable blankets pretending to enjoy the effect of sunrise light upon the Yosemite cliff

and fall, all of us unwilling to own that we were tired out and needed rest. Breakfast had waited an hour or more when we got a little weary of beds and yielded to the temptation of appetite.

A family of Indians, consisting of two huge girls and their parents, sat silently waiting for us to commence, and, after we had begun, watched every mouthful from the moment we got it successfully impaled upon the camp forks, a cloud darkening their faces as it disappeared forever down our throats.

#### Accomplished Camp Cook

But we quite lost our spectators when Longhurst came upon the boards as a flapjack-frier,—a *role* to which he bent his whole intelligence, and with entire success. Scorning such vulgar accomplishment as turning the cake over in mid-air, he slung it boldly up, turning it three times,—ostentatiously greasing the pan with a fine centrifugal movement, and catching the flapjack as it fluttered down,—and spanked it upon the hot coals with a touch at once graceful and masterly.

I failed to enjoy these products, feeling as if I were breakfasting in sacrifice upon works of art. Not so our Indian friends, who wrestled affectionately for frequent unfortunate cakes which would dodge Longhurst and fall into the ashes.

By night we had climbed to the top of the northern wall, camping at the head-waters of a small brook, named by emotional Mr. Hutchings, I believe, the Virgin's Tears, because from time to time from under the brow of a cliff just south of El Capitan there may be seen a feeble waterfall. I suspect this sentimental pleasantries is intended to bear some relation to the Bridal Veil Fall opposite. If it has any such force at all, it is a melancholy one, given by unusual gauntness and an aged aspect, and by the few evanescent tears which this old virgin sheds.

A charming camp-ground was formed by bands of russet meadow wander-

ing in vistas through a stately forest of dark green fir-trees unusually feathered to the base. Little mahogany-colored pools surrounded with sphagnum lay in the meadows, offering pleasant contrast of color. Our camp-ground was among clumps of thick firs, which completely walled in the fire, and made close overhanging shelters for table and beds.

Gardner, Cotter and I felt thankful to our thermometer for owning up frankly the chill of the next morning, as we left a generous camp-fire and marched off through fir forest and among brown meadows and bare ridges of rock toward El Capitan. This grandest of granite precipices is capped by a sort of forehead of stone sweeping down to level, severe brows, which jut out a few feet over the edge. A few weather-beaten, battle-twisted, and black pines cling in clefts, contrasting in force with the solid white stone.

We hung our barometer upon a stunted tree quite near the brink, and, climbing cautiously down, stretched ourselves out upon an overhanging block of granite, and looked over into the Yosemite Valley.

The rock fell under us in one sheer sweep thirty-two hundred feet; upon its face we could trace the lines of fracture and all prominent lithological changes. Directly beneath, outspread like a delicately tinted chart, lay the lovely park of Yosemite, winding in and out about the solid white feet of precipices which sunk into it on either side; its sunlit surface invaded by the shadow of the south wall; its spires of pine, open expanses of buff and drab meadow, and families of umber oaks rising as back-

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### He Stampeded The British Association

when he announced a rational explanation of the origin of whirling storms.

**JAMES P. ESPY**

tells his Philosophy of Storms in  
**THE NEXT CLASSIC OF SCIENCE**

---

ground for the vivid green of river-margin and flaming orange masses of frosted cottonwood foliage.

Deep in front the Bridal Veil brook made its way through the bottom of an open gorge and plunged off the edge of a thousand-foot cliff, falling in white water-dust and drifting in pale translucent clouds out over the tree-tops of the valley.

Directly opposite us, and forming the other gate-post of the valley's entrance, rose the great mass of Cathedral Rocks, —a group quite suggestive of the Florence Duomo.

But our grandest view was eastward, above the deep sheltered valley and over the tops of those terrible granite walls, out upon rolling ridges of stone and wonderful granite domes. Nothing in the whole list of eruptive products, except volcanoes themselves, is so wonderful as these domed mountains. They are of every variety of conoidal form, having horizontal sections accurately elliptical, ovoid, or circular, and profiles varying from such semicircles as the cap behind the Sentinel to the graceful infinite curves of the North Dome. Above and beyond these stretch back long ridges connecting with sunny summit peaks. The whole region is one solid granite mass, with here and there shallow soil layers, and a thin variable forest which grows in picturesque mode, defining the leading lines of erosion as an artist deepens here and there a line to hint at some structural peculiarity.

#### Perfection of Nature

A complete physical exposure of the range, from summit to base, lay before us. At one extreme stand sharpened peaks, white in fretwork of glistening ice-bank, or black where tower straight bolts of snowless rock; at the other stretch away plains smiling with a broad honest brown under autumn sunlight. They are not quite lovable even in distant tranquillity of hue, and just escape being interesting in spite of their familiar rivers and associated belts of oaks. Nothing can ever render them quite charming, for in the startling splendor of flower-clad April you are surfeited with an embarrassment of beauty, at all other times stunned by their poverty. Not so the summits; forever new, full of individuality, rich in detail, and coloring themselves anew under every cloud change or hue of heaven, they lay you under their spell.

From them the eye comes back over granite waves and domes to the sharp precipice-edges overhanging Yosemite. We look down those vast, hard, granite



THE HALF DOME

*"Nothing in the whole list of eruptive products, except volcanoes themselves, is so wonderful as these domed mountains."*

fronts, cracked and splintered, scarred and stained, down over gorges crammed with debris, or dark with files of climbing pines. Lower the precipice-feet are wrapped in meadow and grove, and beyond, level and sunlit, lies the floor,—that smooth river-cut park, with exquisite perfection of finish.

The dome-like cap of the Capitan is formed of concentric layers like the peels of an onion, each one about two or three feet thick. Upon the precipice itself, either from our station on an overhanging crevice, or from any point of opposite cliff or valley bottom, this structure is seen to be superficial, never descending more than a hundred feet.

In returning to camp we followed a main ridge, smooth and white under foot, but shaded by groves of alpine firs. Trees which here reach mature stature, and in apparent health, stand rooted in white gravel, resulting from surface decomposition. I am sure their foliage is darker than can be accounted for by effect of white contrasting earth. Whichever, in deep depressions, enough wash soil and vegetable mould have accumulated, there the trees gather in thicker groups, lift themselves higher, spread out more and finer feathered branches; sometimes, however, richness of soil and perfection of condition prove fatal through overcrowding. They are wonderfully like human communities. One

may trace in a hour's walk nearly all the laws which govern the physical life of men.

Upon reaching camp we found Longhurst in a deep religious calm, happy in his mind, happy, too, in the posture of his body, which was reclining at ease upon a comfortable blanket-pile before the fire; a verse of the hymn "Coronation" escaped murmurously from his lips, rising at times in shaky crescendos, accompanied by a waving and desultory movement of the forefinger. He had found among our medicines a black bottle of brandy, contrived to induce a mule to break it, and, just to save as much as possible while it was leaking, drank with freedom. Anticipating any possible displeasure of ours, Longhurst had collected his wits and arrived at a most excellent dinner, crowning the repast with a duff, accurately globular, neatly brecciated with abundant raisins, and drowned with a foaming sauce, to which the last of the brandy imparted an almost pathetic flavor.

The evening closed with moral remark and spiritual song from Longhurst, and the morning introduced us to our prosaic labor of running the boundary line,—a task which consumed several weeks, and occupied nearly all of our days.

## PHYSIOLOGY

# Ferment in Digestive Fluid Purified for First Time

THE DIGESTIVE ferment of the stomach, that dissolves the starch in foodstuffs and makes it available for the energy needs of the body, has been prepared in the pure state for the first time in the chemical laboratories of Columbia University.

This marks an important step towards finding out what these complicated ferments really are, a problem that has hitherto remained unsolved because they could not be obtained pure.

Prof. H. C. Sherman, who is well known as an authority on the vitamins, and two associates, Prof. M. L. Caldwell and L. E. Booher, announce their accomplishment in a report to *Science*.

The crystals of diastase or amylase, as the starch ferment is called by chemists, were obtained from solutions of pancreatic extract in a mixture of alcohol and water. The crystals show resemblances to proteins, those nitrogen-containing compounds which form so large a part of the stuff of the body. Because of this the crystallization must be carried out with very slight changes in temperature and the amount of acid in the solution controlled accurately.

This is the third digestive substance to be isolated. Protease, also found in digestive juice, which digests proteins like gelatin or the casein of milk, was recently crystallized by Dr. John H. Northrop and Dr. M. Kunitz at the Rockefeller Institute for Medical Research at Princeton, N. J.

Urease, the enzyme that transforms urea into ammonium carbonate for

## FORESTRY

## Sunlight on Logs Cooks Beetles to Death

DIRECT RAYS of the sun are being utilized by forest service entomologists in exterminating destructive beetles which in recent years have killed millions of board feet of timber near Diamond Lake, just north of Crater Lake National Park. The treatment is applied by felling beetled-infested trees and exposing the trunks to the sun in forest clearings.

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plant use, was first made crystalline in 1926 by Dr. James B. Sumner at the Cornell Medical College.

The enzymes or ferments play a very important part in the life processes of plants or animals. They accelerate chemical reactions without themselves being used up in the process. Chemists call such substances in general catalysts; though enzymes are very special kinds of catalysts which are extremely unstable and therefore difficult to handle in the laboratory.

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## MEDICINE

## Common Chemical Bath Ends Ringworm Epidemic

A BATH with a common chemical, sodium thiosulphate, effectively wiped out ringworm of the feet in the Albany Junior high school, where hundreds of the pupils representing at least half of the total enrollment had the disease, Dr. William L. Gould of

## PHYSICS

## Air Vibrations in Organ Pipes Revealed by Pattern in Smoke

## See Front Cover

MAKING smoke rings in organ pipes, to show up the little cyclones that whirl in them when obstacles are placed in the openings, is the curious mode of research adopted by a London physicist, Prof. E. N. da C. Andrade of University College. These little cyclones, or vortices, have important effects on the tones of the pipes. By photographing them in smoke, Prof. Andrade is able to check up the accuracy of mathematically calculated theories never before tested.

His smoke method is an improvement on the one previously in use, which was devised by a German scientist named Kundt. The Kundt method employs dust, but since dust particles are much bigger and heavier than

Albany has reported to the American Medical Association.

Ringworm, also known as toe itch, toe scald, fungus foot, athletic foot, Hongkong foot and Shanghai foot, is very common, very old and very widespread.

It is an infection with a fungus. Healthy carriers of ringworm exist just as in the contagious diseases. These people have the disease without symptoms, but are a source of danger as they may at any time acutely affect themselves or others. Peeling of the skin between the toes or around the nails, the formation of watery blisters, cracking of the skin, itching and burning are found in various types of ringworm.

Measures such as excluding the children from gymnasium classes and swimming pool, and swabbing with iodine and mercurochrome, were tried without success. Then the sodium thiosulphate bath was installed between the locker and the shower rooms. Each pupil on the way from shower to locker room immersed his feet in the chemical bath.

The sodium thiosulphate solution is colorless and nearly odorless, so there is no objection to its use. If the bath is not convenient, a 20 per cent. powder of sodium thiosulphate in boric acid may be successfully used, Dr. Gould reported.

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smoke particles, the older method is less sensitive.

Prof. Andrade is engaged in an investigation of what happens to the air in such musical tubes as the pipes of an organ when they are producing their tones. He has found that the smoke particles show by their motion the exact motion of the air. The circulation of air in such tubes had been predicted by the late Lord Rayleigh but was never shown before.

The most beautiful photographs are obtained when a small obstacle is placed in the path of the air currents. New vortices are formed in the neighborhood of a cylindrical barrier in a way that is very striking and can not be easily shown by any other kind of experiment.

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## ZOOLOGY

# Ostrich Running 70 Miles an Hour Bulldogged From Auto

"**B**ULLDOGGING" ostriches from the running-board of an automobile speeding through the Syrian desert at more than 70 miles an hour was the exciting variant of the Wild West sport practiced in the Near East by Prof. A. Aharoni of the Hebrew University, Jerusalem. Prof. Aharoni led a zoological expedition into the Syrian desert recently, to collect specimens of its rare animals and birds. When he was not heard from for six weeks, fears began to be entertained for his safety, but finally a letter arrived, dated from Karyatein, in the Palmyra region.

"We have succeeded in reaching places in the desert which have never yet been touched by any scientists," Dr. Aharoni wrote. "Ostriches are growing scarcer and scarcer here, and they, too, like so many other rare animals and birds in Palestine, are threatened with rapid extinction.

"After two days of preparation, we started out on the chase. For eight days we just looked for ostriches. Finally we caught sight of a small group of four ostriches, through our telescopes.

"And now the real chase began, at a speed of 115 kilometers [71 miles] an hour. The ground which harbors the

Syrian ostrich is so unevenly bumpy that we were constantly in danger of overturning in our overpacked and overloaded machines. Besides Sheikh Medjhem and Sheikh Chalid, a number of simple tribesmen, who were considered the best shots, accompanied us.

"Fortunately the ostrich always runs in a straight line, but he must be attacked from the flank, because the stones he throws behind him in running fly with such force that the glass windshields of automobiles cannot withstand them. After a wild and bitter chase that lasted over two hours, we managed to get near enough to shoot at one of the ostriches, which, however, made its escape into the mountains, where no auto could follow it. A second ostrich was killed, but we left it lying where it was, so that we could pick it up on our way back.

### Bedouin Grabs Ostrich

"The other two ostriches we planned to catch alive. So one of the tribesmen stood on the outermost edge of the running board of our machine and, bending over, grasped one of the ostriches, an almost black one, by one of his enormous wings, as we rode past at terrific speed.

The bird was so powerful that he would have dragged the Bedouin off his slight hold on the running board and killed him, had not one of his brother Arabs caught hold of him from inside the auto and held on with all the strength he possessed. So we tied the bird and took it into the already overcrowded machine and continued the chase after the fourth ostrich. This one was already so fatigued that he could be caught after scarcely a half hour's pursuit."

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## ARCHAEOLOGY

### Graves of Huns Are Found in Mongolia

**D**ISCOVERY of some graves of the terrible Huns who ravaged southern Europe during the first few centuries after Christ aids in tracing the connection of ancient Mongolia with the East and West. The finds of P. K. Kosloff, Russian explorer, show both Chinese and Grecian influence. Almost all the tombs contained golden ornaments, tapestries, carpets, weapons, or idols. The remains of these Mongolian princes were badly preserved, only the hair being intact.

Approximately 150 of the Hun graves were located by the Kosloff expedition which proceeded with a caravan of 50 camels to the region near Urga, northeast Mongolia. The coffins lay in subterranean mausoleums constructed of ebony. Thieves had rifled many of the tombs, but while taking much of value did not destroy the rest.

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### OLD SABER-TOOTH TAKES FIRST RIGHTS TO THE KILL

In one of the new paintings in the Field Museum of Natural History, Charles R. Knight, graphic chronicler of ancient life, has shown a dramatic moment in the turbulent days around the LaBrea tar-pits in California, some 50,000 years ago when the West was really wild and woolly. One of the great fanged cats stands off a flock of hungry condors and a pair of wolves, while his mates gorge themselves on the flesh of some luckless beast—possibly a horse—which they have found trapped at the outer edges of the sticky asphalt.

## ARCHAEOLOGY

**Dice Rolled In Near East  
More Than 4500 Years Ago**

ONE OF THE OLDEST dice in the world, whose discovery by an archaeological expedition in Mesopotamia indicates apparently that games of chance were not unknown to the ancient inhabitants of that country, has been acquired by the University of Pennsylvania Museum.

The die, which dates from about 2750 B.C., was found at Tepe Gawra by Dr. E. A. Speiser, who recently returned to this country after carrying on archaeological excavations in Mesopotamia. It is cubical in shape and is made of baked clay.

In only one respect does the Tepe Gawra die differ greatly in appearance from the modern variety. Whereas the modern die is so marked that the sum of the dots on any two opposite sides totals seven, the numbers on the ancient cube are arranged so that five opposes four and two opposes three.

The University Museum has among its collection a backgammon board which dates from about 3000 B.C.; it was found at Ur of the Chaldees. It is not improbable that the die found at Tepe Gawra was one of a pair used in playing that game.

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Experts can tell how hot a flame is with surprising exactness by noting the deepness or paleness of the color.

Synthetic oils from paraffin wax are less affected by varying temperatures than any known natural oil.



COME SEVEN!

*Two views of the ancient die found at Tepe Gawra, Mesopotamia, by Dr. E. A. Speiser. It dates from about 2750 B.C. and may have been used in playing backgammon.*

## PHYSICS

**Invisible Alpha Particle Path  
Bent by Great Magnet**

ALPHA PARTICLES are the hearts of helium atoms. They are so small that nobody has ever seen them.

Yet, in spite of their diminutive size, M. Rosenbloom, of the Faculty of Sciences of the University of Paris, has found it necessary to use an electromagnet built of coils of wire a yard in diameter and operated by a small power plant to make them change the direction in which they are traveling.

With this apparatus for bending the paths of the swift alpha particles, the

French scientist has found that the particles from some radioactive atoms like radium consist of distinct groups of equal speeds, the speeds of the groups, however, being different. This gives a means of finding out the structure of the intensely small core of the atom, which is the present goal of atomic physical research.

The most typical mode of disintegration of radium and other radioactive bodies is by the expulsion of alpha particles with great velocity and energy. These are helium atom cores. It has long been known that from a given element the helium particles appear to be expelled with the same characteristic speed. This indicates that the alpha particle occupies a certain definite energy level in the atom which is defined by so-called quantum conditions.

In the radioactive thorium-C atom, which has now been found to consist of a number of distinct groups each characterized by a certain speed, Lord Rutherford has pointed out, these groups disclose the existence of several energy levels within the nucleus.

Ordinary electromagnets are not able to cause sufficient deflection but with the assistance of the magnet Prof. Aime A. Cotton, at the Sorbonne, can bend the alpha particles round in a semi-circle and separate them out.

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ZOOLOGY  
*Nature Ramblings*  
By FRANK THONE



Weasel

**A**N ANIMAL for whose relative scarcity all poultry-keepers are thankful is the weasel. He is the very incarnation of relentless pursuit and insatiable bloodlust, and the great majority of people hate him—and fear him a little—without ever seeing him in their lives. Yet his cast-off clothing becomes the garments of kings. For one species, the long-tailed weasel, in winter puts on shining white fur, except for a jet-black tail-tip, and becomes the ermine.

The reputation of the weasel runs back to the Middle Ages at least, as that very old folk-song, "Pop Goes the Weasel", would indicate. And "Pop" he does go, without any question, for his light, slim, muscular body is a collection of living springs. He is, for his size, the finest jumper in the animal world. Naturalists state that he has even been seen to leap into the air and capture low-flying birds.

Mostly, however, the weasel hunts by scent. Once on the trail of a luckless animal he follows him remorselessly as fate, and sooner or later surely overtakes him. It does the victim no good to climb trees for the weasel can climb as well as he. It does him no good to hide in a hollow limb or in a crack in the rock, for the leaping death that follows him can crawl through any crevice. Once in a while a terrified hare will forsake the timber and by a burst of speed in the open leave him behind; but slower game never escapes. The one good thing that can be said of the weasel is that he keeps down the number of small rodents, which might otherwise become a pest.

Science News Letter, July 18, 1931

## PSYCHOLOGY

Nervousness Major Cause  
In Automobile Accidents

**N**ERVOUSNESS on the part of the driver, especially where muscle coordination is poor, has been named a major cause in automobile accidents. Under the auspices of the National Research Council, Dr. A. R. Lauer and the late Dr. A. P. Weiss made a two-year study at Ohio State University of the psychological principles in automobile driving.

Visual defects, the psychologists learned, are not dangerous in themselves but only to the extent to which they produce a strain on the operator of the car. Of these actual defects, that of being cross-eyed is the one most highly associated with accident probability.

Certain types of accidents are largely due to inattention resulting from a tired or worried condition. Any single defect, however, may be compensated by other adjustments, especially if the individual knows his limitations.

Automotive driving should be regarded, Drs. Lauer and Weiss stated, partly as an educational problem. Because the actions of individual drivers are so complex, it is unreasonable to hope at the present for a simple test to determine their skill. Rather should the actual performance of each driver be measured, and consequently a complete standardization of measuring apparatus for this purpose is needed.

Science News Letter, July 18, 1931

## BACTERIOLOGY

Food is Main Problem  
Of Bacteria at Sea

**B**ACTERIA that are carried out to sea in myriads by rivers and are washed down by rain from the air have a good chance of surviving in their new and strange environment, if only they can find enough to eat. This is indicated by experiments performed at the State College of Washington, Pullman, Wash., by Prof. Victor Burke and Lenna A. Baird.

They took a score of different kinds of bacteria from a river, cultured them in the laboratory, and planted samples from their cultures in both fresh and salt water. After a time they counted survivors, and found that most of their species were doing almost as well in salt water as they were in fresh.

Science News Letter, July 18, 1931

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School, Emmits-  
burg, Maryland-

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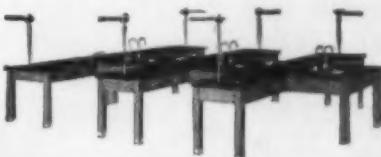
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# • First Glances at New Books

## Scientific Method

**HUMANISTIC LOGIC**—Oliver L. Reiser—*Crowell*, 326 p., \$3.00. People who never thought of reading a book on logic before will find themselves reading this book like a novel. Prof. Reiser proceeds on the assumption that logic is an activity pursued by living human beings who have other things on their minds besides the spinning of metaphysical spider-webs. Scientists who have recently discovered an interest in logic will read the book with great interest. Part 2, "Logic and the Sciences" and Part 4, "How New Knowledge is Obtained" are particularly timely and show Prof. Reiser's unusual insight into these matters.

*Science News Letter, July 18, 1931*

## Aviation

**WINGS OF TOMORROW, THE STORY OF THE AUTOIRO**—Juan de la Cierva and Don Rose—*Brewer, Warren and Putnam*, 300 p., \$2.50. The inventor of the "windmill plane" traces the development of his idea from his school days in Spain when he built gliders, to the present. An exceedingly interesting record of a craft which will be increasingly used.

*Science News Letter, July 18, 1931*

## Ornithology

**WHY BIRDS SING**—Jacques Delamain—*Coward McCann*, 298 p., \$2.50. Here is a book that combines good popular natural history with the Gallic literary style at its best—a combination with which the English-reading public has already been made familiar in translations of Fabre and Maeterlinck. Crowned by the French Academy in the original, the book has been very adequately done into English by Ruth and Anna Sarason.

*Science News Letter, July 18, 1931*

## Engineering

**CONCRETE DESIGN AND CONSTRUCTION**—Walter Loring Webb and W. Herbert Gibson—*American Technical Society*, 374 p., \$2.50. A book that tells engineers and students how to use a substance which in a comparatively short time has become one of the most useful building materials.

*Science News Letter, July 18, 1931*

## Aeronautics

**THE BOOK OF GLIDERS**—Edwin Way Teale—*Dutton*, 379 p., \$2.50. As a man who has built and flown gliders, the author describes "the thrill of drift-

ing noiselessly through the air, rising and descending upon the varying wind currents". Ancient as well as modern types of craft are pictured, and the stories of famous soaring flights related. Practical information on how to build gliders, organize glider clubs, etc., is included in the latter part of the book.

*Science News Letter, July 18, 1931*

## Entomology

**THE ROMANCE OF THE HIVE**—F. C. Pellett—*Abingdon Press*, 203 p., \$2. A chattily written, informative popular book about bees and bee-keeping.

*Science News Letter, July 18, 1931*

## Physiology

**AN INTRODUCTION TO HUMAN EXPERIMENTAL PHYSIOLOGY**—F. W. Lamb and A. V. Hill—*Longmans, Green*, 335 p., \$4. A textbook for students of medicine and of general science which is the result of ten years' research into the best and most effective method of introducing them to this important subject. The method is that of having the students observe on themselves the physiological processes which they will later observe on their patients or their experimental subjects. The book gives directions for each student to examine his own blood, to observe the workings of his own or his neighbor's heart, digestive apparatus, etc. References to the literature are given at the end of each chapter.

*Science News Letter, July 18, 1931*

## Paleontology

**HANDBOOK OF PALEONTOLOGY FOR BEGINNERS AND AMATEURS. PART 2: THE FORMATIONS**—Winifred Goldring—*N. Y. State University*, 488 p., \$1.25. This completes a very worthwhile work, the first part of which, dealing with the fossils, appeared a short time ago. Like its companion volume, this book is clearly written and cleanly illustrated, and is admirably fitted for its purpose.

*Science News Letter, July 18, 1931*

## Aeronautics

**CRUISERS OF THE AIR**—C. J. Hylander—*Macmillan*, 308 p., \$2.50. The story of lighter-than-air craft, from the days of Roger Bacon to the making of the ZRS-4, illustrated with many photographs, and with drawings and diagrams by the author. Originally written for boys, this book is an intensely interesting history of airships, and will find an equally appreciative audience among adults.

*Science News Letter, July 18, 1931*

## National Parks

**RAINBOW CANYONS**—E. T. Scoyer and F. J. Taylor—*Stanford University Press*, 105 p., \$2. The Canyon of the Colorado is properly called "grand" and "beautiful" is the right adjective for the Canyon of the Yellowstone. In between, down in southern Utah, there are several others, more recently made accessible to National Parks travellers, most notably Bryce and Zion canyons. For these, "gorgeous" would seem the just word. In this book there are gathered for the first time adequate descriptions of the scenery (insofar as any description thereof can be adequate), notes on natural history and compact historical accounts, together with some first-class photographic illustrations. The author-team is qualified to speak for these parks: Mr. Scoyer was their first permanent superintendent, and Mr. Taylor is a writer of long experience with national park subjects.

*Science News Letter, July 18, 1931*

## Physics

**THE NATURE OF A GAS**—L. B. Loeb—*Wiley*, 153 p., \$2.50. This volume is the first of a series of monographs to be published under the auspices of the Committee on Electrical Insulation of the National Research Council. A knowledge of the newer views of gas behavior admirably outlined here by Prof. Loeb, is necessary in understanding the wide variety of uses which gases now find as insulators.

*Science News Letter, July 18, 1931*

## Plant Physiology

**PLANT PHYSIOLOGY**—Edwin C. Miller—*McGraw-Hill*, 900 p., \$7. A few years ago professors of plant physiology complained, and justifiably, of a dearth of good textbooks to place in the hands of their advanced undergraduates and beginning graduate students. This lack has been notably supplied; yet the present volume will surely make a place for itself, because it is well-written and well-arranged and because it has caught up with the literature to within a few months before its publication date—an important thing with a constantly-advancing discipline like plant physiology. The teaching physiologist will welcome especially the review questions and the generous bibliography appended to each chapter.

*Science News Letter, July 18, 1931*